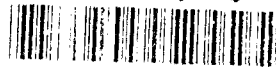


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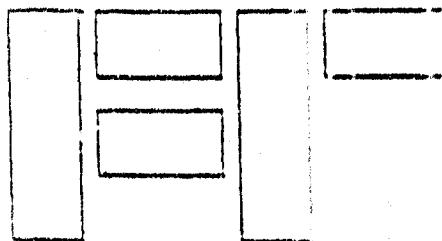
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R E S E A R C H  
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RESEARCH WOMEN'S SKIRT AND  
SLACK PRODUCTION

*Fashion Institute of Technology*



DA900-87-D-0016/0011

APRIL 1992

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**ADVANCED APPAREL MANUFACTURING TECHNOLOGY**

**FASHION INSTITUTE OF TECHNOLOGY**

**DLA900-87-D-0016-0011**



**RESEARCH WOMEN'S SKIRT AND  
SLACKS PRODUCTION**

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**FINAL TECHNICAL REPORT A008**

**Josef Korngruen  
Project Leader**



**APRIL, 1992**

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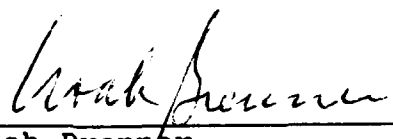
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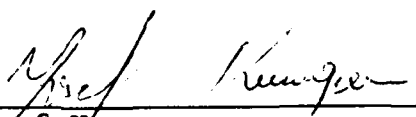
RESEARCH WOMEN'S SKIRT  
AND SLACKS PRODUCTION

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It is hereby submitted to the DLA office (DPMSO), Cameron Station, Alexandria, VA 22304-6100 in accordance with the Contract Data Requirements List, sequence A008.

  
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April 30, 1992

RESEARCH WOMEN'S SKIRT  
AND SLACKS PRODUCTION

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS . . . . .	iii
TABLE OF CONTENTS . . . . .	iv
BACKGROUND . . . . .	1
INTRODUCTION . . . . .	2
CHRONOLOGY . . . . .	3
PHYSICAL MANUFACTURING PROCESS . . . . .	10
MANUFACTURING ANALYSIS . . . . .	12
FIT TEST RESULTS . . . . .	13
CONCLUSION . . . . .	14
APPENDIX A - GARMENT SPECIFICATIONS/CONTRACT REQUIREMENTS	
APPLICABLE SPECIFICATIONS . . . . .	15
DELIVERIES . . . . .	17
SIZE TARIFFS . . . . .	18
APPENDIX B - MANUFACTURING OPERATION SEQUENCES	
SLACKS . . . . .	21
SKIRT . . . . .	22
APPENDIX C - FIT TEST REPORTS	
SKIRT . . . . .	23
SLACKS . . . . .	24
APPENDIX D - PATTERN PARTS	
SKIRTS . . . . .	25
SLACKS . . . . .	26

BACKGROUND

The Army, during the conduct of a research and development project to change the women's skirt, found through its market research that the then current skirt [MIL-S-44102(GL)] and slacks [MIL-S-44092 (GL)] had to be modified to meet the needs of the soldiers. Attendant to making these modifications, the Army also wanted to ensure an improvement in the ease with which garment alterations could be accomplished, and, to whatever extent possible, standardize the garment styles and construction with those of the other military services.

The result of these requirements was the issuance of a Request for Proposal (RFP) and Statement of Work (SOW) returnable not later than October 30, 1990, to which the Fashion Institute of Technology's Advanced Apparel Manufacturing Technology Demonstration (F.I.T./AAMTD) Center responded on October 29, 1990. Subsequently, the closing date for proposals was extended to December, 1990. Final award of the project was not made until March 11, 1991.

## INTRODUCTION

The contract for this short term research and development task was awarded to the AAMTD Center at the Fashion Institute of Technology on March 11, 1991. Phase I of the project required the review of the production methods for the redesigned U.S. Army women's skirt and slacks; the construction of three different pre-production size samples of both garments from the newly developed patterns, which were supplied by the U.S. Army Natick Research, Development and Engineering Center (NRD&EC); and, upon approval of the pre-production samples, the project required the production of one pair of slacks and one skirt in each of 81 different sizes (this was subsequently reduced by contract modification to 55 different sizes for each garment).

Phase II of the project required the production, after all changes and modifications desired by NRD&EC were incorporated into the patterns and specifications, of 220 skirts and 220 slacks, with each garment type broken down into 52 different sizes (see Appendix A, Size Tariff for Delivery 2). The garment production program was to be followed by fit-testing of the garments and the development of up-to-date manufacturing specifications.

Garment specifications and other pertinent information that was contained in the SOW/RFP and the contract are reproduced in Appendix A.

CHRONOLOGY

MARCH 1991 - The project was activated on March 11, 1991 and a set of newly developed patterns digitized on a Gerber Systems AM-1 tape was received from Army NRD&EC two days later. AM-1 tapes are not compatible with any F.I.T./AAMTD system and, therefore, it was necessary to enlist the assistance of Gerber Garment Technology, Inc. (GGT) to have this tape converted to run on a Gerber AM-5 system.

Before proceeding with the production of the required 55 skirts and 55 slacks, three pre-production samples of each garment had to be submitted for approval to insure that the patterns and grading were correct. Consequently, three size samples of each garment were cut and prepared for sewing. Although we did not have any problems with the sizing or the pattern shapes, we did find two items that needed clarification. First, the 7-inch skirt zipper called for in the specifications proved to be too short for the new skirt design. We felt that an 8-inch zipper would be the correct size. Second, the slacks sample received from Army NRD&EC did not have a waistband extension but the patterns did.

The above noted problems were duly reported by month's end to the Army's project coordinators, Captain Kathleen Batton and Ms. Martha McCagg.

APRIL 1991 - The three pre-production samples of each garment were sewn up and although we encountered some sewing assembly problems with the skirt pockets we were able to correct them without difficulty. On April 8, the Army project coordinators visited F.I.T./AAMTD and inspected the finished pre-production samples and reviewed our pattern and construction change recommendations. They gave us their verbal approval of the six pre-production samples; agreed that the size change of the skirt zipper was necessary; and told us that the patterns were correct and that the slacks should be made with a waistband extension.

Without formal written approval we could not proceed with production. Therefore, we limited our activities to preparing the necessary markers and cutting discs so as to be ready to start sewing immediately after receiving the formal approval.

When formal approval was received at month's end from Defense Personnel Support Center (DPSC), Philadelphia, we were also notified that the size tariffs were reduced from 81 to 55 sizes. The completion of Phase 1 of the project, assembly of one slack and one skirt in each size was ready to proceed.

MAY 1991 - The assembly of the pre-production samples cleared up our pattern and assembly concerns and helped make the production of the 55 skirts and 55 slacks run smoothly. Since only one garment of each size had to be cut, all cutting was done single-ply. A total of 48 markers had to be cut to obtain the 110 garments and interior parts because our Gerber Cutter has a 4-1/2 yard length limitation and this limited the marker length to three skirts or two slacks. All garment parts were shade marked to insure proper matching during assembly. The required garment labels were printed in-house on one of the computers at the F.I.T./AAMTD Center.

Sewing of the skirts started on May 1 with one operator at the machines. Two more operators were added on May 6, and all 55 skirts were finished by May 15 with each sewing operator working on only one garment at a time so as to avoid any potential mix-up of parts.

The skirt assembly process pointed out two areas of concern, the side seam and the physical dimensions of the patterns.

This newly designed skirt has three gores and quarter top pockets. When the front is joined to the back the seam becomes very bulky (six plies) at the lowest part of the pocket. To avoid a bulge at that point the front seam allowance must be notched carefully and must also be pressed open carefully. With proper operator training that problem should be overcome.

The physical dimensions of the skirt patterns is the other problem. The present size does not allow for any fabric shrinkage during the production cycle. Therefore, assembling the garments with the specified seam allowances produced them on the tight side. The amount of shrinkage that occurs during the production cycle depends on the quality of the sponging that is done during fabric finishing. Normal practice is to allow for a 3% to 5% garment shrinkage during assembly as a result of the underpressing and finish pressing that the garments undergo. This allowance can be provided in either of two ways, change the size specifications of the garments (make them smaller) or make the patterns larger to compensate for the shrinkage. It is the latter method that is recommended. Maintaining size constancy across the garment mix is important. Different waist and hip sizes for skirts and slacks is not desirable.

The assembly of the slacks followed the completion of the skirts. No difficulties in the production of the slacks were encountered and all 55 were complete by May 24. The under-pressing was accomplished by each sewing operator on an as-needed basis, whereas finish pressing was completed by a laboratory technician on in-house pressing machines.

The assembly of the slacks did not create any concerns and progressed smoothly. The Army-supplied waistband curtain which was used for both type garments proved easy to use and is believed to enhance the utility of the garments. The belt loops were set, with approval of the Army personnel, in a different manner than is illustrated on the standard sample. The Army-supplied sample had been assembled with the belt loop tops sandwiched between the waistband and the waistband curtain which precludes the use of an automatic belt loop setting machine. The belt loops on the garments produced at F.I.T./AAMTD were set after the garment was complete and were folded at each end and then tacked down. This procedure allows the use of an automatic belt loop setting machine and eliminates the need to set the center back loop separately.

All garments were completed and ready on time for the May 30 inspection and measuring by the army NRD&EC representatives Ms. Martha McCagg and Ms. Elizabeth McCoy.

The garments were prepared for inspection and size checking by separating them into three length groups - short, regular, and tall. The garments were then sequenced according to size, smallest size on top and largest size on bottom. To eliminate the need for specification size tables and to facilitate the measuring effort, an easy to read tolerance chart was taped to the work table and a tag was pinned on each garment that listed the specified dimensions for that size. Also, to ease the measuring of the hip dimensions templates were prepared, one for each garment length group. These were used to locate the center back distance from waist to hip. These inspection and measuring aids materially facilitated the inspection process.

The inspection session went well, all garments met specifications. Thereupon, they were sent to the MDW Control Branch, Cameron Station, VA to be used for a fit test during the latter part of June.

JUNE 1991 - All 55 sizes of the slacks and skirts were fit-tested during the last two weeks of June in a process supervised by Captain Kathleen Batton and Ms. Martha McCagg and attended by the author and Professor Hilde Jaffe.

The objectives of the fit-test were to find out if the patterns and manufacturing processes are correct and to get a consensus of the acceptability of the new design. A group of 300 volunteers were tested over a twelve day period. A file was created for each volunteer which contained her anthropometric measurements and the answers to a questionnaire about the fit and utility of the garments. It took 90 to 120 minutes for each person to go through the entire test procedure

of being measured and trying on a total of 21 garments: 3 different size garments of each of 3 styles of blouses, 2 styles of skirts, and 2 styles of slacks. The purpose of trying on 3 sizes of each garment was to determine whether the garment grading and size range was correct.

The author and Prof. Jaffe's concerns were limited to the slacks and skirts that had been produced in the F.I.T/AAMTD Center. The other slacks and skirts that the Army included in the fit-test provided a comparison between the old and new styles.

As noted previously, the newly designed skirt has 3 gores and quarter top pockets. When the front is joined to the back the seam becomes very bulky (6 plies) at the lowest part of the pocket. None of the fit-test volunteers are known to have complained or remarked about this bulkiness. All, however, noted that the addition of the pockets was a definite plus for the garment. One senior officer would have preferred on-seam pockets, but we explained that that would make the side seam even thicker because it would place the zipper tab and the pocket welt right at the hip. Overall, the construction of the skirt was well received: the majority felt it was an improvement over the present garment in use.

The physical size of the skirt pattern was a major problem. The skirts were between one and two sizes smaller than those normally worn by the fit-test volunteers. A soldier who normally wears a size 8 needed a 10 or 12 for a proper fit.

While the assembly of the slacks did not create any concerns, the fit-test pointed out that there was a problem with the pattern. Many of the slacks fit-testers found that the seat rise was too small and that the inseam was improperly positioned thereby making the seat too tight and the front at the lower end of the fly too full.

The majority of those who tried on the slacks reacted favorably to the changes in the redesigned garment: a waistband with belt loops and a belt (which makes the garment look trimmer and creates a better military appearance); shirt hugs which prevent the blouse from creeping out of the slacks; and, a centerback seam which allows for easier alterations.

The specifications for the garments to be produced in Phase II are dependent on the data generated during the fit-test and their analysis. The Army will have to decide how it will resolve the slack pattern problem.

Although no manufacturing was done during June 1991, flow charts (Appendix B) were developed which show the sequences of operations that were followed by the F.I.T./AAMTD sewing machine operators and pressers during the production of each of the garments. Also, a proposal for developing new basic patterns and prototypes of the slacks that would more adequately meet the Army's fitting requirements was developed.

JULY 1991 - The proposal for reworking the basic slack patterns and prototypes was submitted to Army NRD&EC. No other activity took place pending receipt of a decision on this proposal and the generation of a set of new directions from the Army.

AUGUST 1991

SEPTEMBER 1991

OCTOBER 1991

All project activities remained suspended pending receipt of instructions from Army NRD&EC.

NOVEMBER 1991 - Word was received from Army NRD&EC that the new skirt patterns had been completed and they were ready to proceed with the skirt portion of Phase II. They forthwith delivered a new sample skirt and a computer tape of the new patterns. The tape was immediately forwarded to Gerber Garment Technology, Inc. for conversion this time, to the AccuMark 300 format for our use.

DECEMBER 1991 - The requirement for starting the skirt portion of Phase II was that we produce a production-type sample of the skirt using the new patterns. However, several of the regular-length patterns became misaligned during the AccuMark conversion process and had to be realigned. Nonetheless, the first new skirt was finished and ready for measuring by December 12.

Captain Kathleen Batton and Ms. Martha McCagg, the Army project coordinators, met with us at the F.I.T./AAMTD Center on December 16 to examine the new sample skirt and to discuss the various fine points of production relating to it. They approved the sample garment and gave us verbal instructions to proceed with the production of the remaining 220 skirts in 52 different sizes but only upon receipt of official written approval.

By year's end official written approval was not received. Nevertheless, by that time all markers had been made and we were ready to start cutting as soon as we got the signal. All of the necessary components for the skirts, except the proper Army green buttons, were on hand and Ms. McCagg had promised to locate the small quantity of them that are needed for this project.



Work on the slacks portion of Phase II was held in abeyance pending our receipt of new, revised patterns from Army NRD&EC.

JANUARY 1992 - Official written approval to proceed with the skirt production was received January 13. Cutting started on the 14th and sewing assembly on the 15th. The patterns were very good and all parts fit well.

We also received a hard set of patterns of a Misses slack, size 12 regular, and a data tape of graded Misses regular length patterns. The tape was converted to our computer format by Gerber Garment Technology in a turn-around time of three days, whereupon we immediately cut and assembled one pair of slacks for approval by Army NRD&EC. Verbal approval was obtained on January 30 from Ms. McCagg.

To expedite the completion of the project we were asked by Army NRD&EC to do the rest of the pattern work: complete the grading of the patterns for Junior's and Women's regular hip sizes and grade all body types for short and tall lengths. In order to meet the size specifications we also had to adjust the waist and waistband dimensions, add a seam allowance to the pocket stay, create a left waistband pattern, grade the slack pocket patterns for Women's and Junior's hip sizes and make other pattern adjustments as necessary. This work, and the marker making, took a little more than two weeks to complete.

FEBRUARY 1992 - The prototype skirt production continued to proceed smoothly: the production of 220 garments in 52 different sizes was completed without incident. Shipment was made on February 19 to Alexandria, VA in time to meet the requirements of the fit test of the skirts that began February 26 and ran through March 4.

Formal approval of the pre-production sample of the slack was faxed to us on February 1st. Having been given this direction the grading work on the slack patterns and the preparation of the cutting markers was completed. When the sewing and assembly of the slacks was initiated it was noted that the hip dimensions of the finished garment did not match the figures shown on the dimensions chart furnished by the Army NRD&EC personnel. We contacted them immediately, explained the situation, and then prepared and shipped five different size garments to them via an overnight delivery service.

Within twenty four hours we were informed that the dimensions chart we had been given was incorrect and a new chart was faxed to us at once. The new chart permitted us to match the dimensions of the slacks with the dimensions requirements without any further problems and sewing and assembly proceeded. By month's end about half of the slacks we had to produce had been assembled.

CHRONOLOGY

RESEARCH WOMEN'S SKIRT  
AND SLACKS PRODUCTION

MARCH 1992 - Fit tests of the skirts, which began on February 26, were completed by March 4 whereupon wear tests of these garments were begun.

Slacks production was completed and shipment/delivery to Alexandria, VA on March 10 of 220 garments was accomplished in time to meet the March 12 deadline and the requirements of the fit-tests that began March 16 and ran through to March 21.

APRIL 1992 - Copies of the fit test report were received from Army NRD&EC (Appendix C) and analyzed. This completed the work on the project.

### PHYSICAL MANUFACTURING PROCESS

The production of the prototype skirts proceeded very smoothly: we had no problems with pattern data and had only one minor production/assembly problem, which is explained below.

The skirt is composed of the following parts (See Appendix D, Exhibits A1 - A7):

1. Front panel
2. Left and right back panel
3. Left and right pocket facing
4. Front and back waistband
5. Front and back waistband curtain
6. Left and right pocket bag
7. Zipper placket
8. 5 belt loops.

That one minor problem we had with the assembly of the skirt concerned the specified 8-inch zipper. It was 1/2 inch too long for the patterns as they were cut and would make the zipper assembly too bulky at it's lower end on the side seam. Our recommendation to change the zipper from an 8 inch length to a 7-1/2 inch length was accepted and production proceeded with the shorter zipper which allowed the necessary side opening to be produced without the bulk at the side seam.

Unfortunately, things did not move as smoothly with the slack patterns. We received a set of hard patterns of a Misses size 12 regular and a data tape for a set of graded Misses regular length patterns. The tape was converted for us from the Army's AM-1 to our computer format by Gerber Garment Technology, Inc. in a turn-around time of three days. During that time, because the Army's project team wanted to move the project process forward as quickly as possible, we used the hard patterns to manually cut and assemble one pair of slacks which we immediately sent to the Army NRD&EC for approval even though we had not had an approved standard sample of the slacks to work from. We received verbal approval on January 30 from Ms. Martha McCagg, one of the Army project leaders. This was also the day on which we received the approved standard sample of the slacks. Formal approval from DPSC of the pre-production sample was received on February 1, 1992 via fax.

To expedite the progress of the project we were also asked to do the rest of the pattern work. This meant we had to grade the patterns for Juniors and Womens hip sizes and grade the garment lengths for shorts and tall. To meet size specifications we found it necessary to adjust all the waist and waistband dimensions.

There were also two other patterns parts that had to be worked on: the left waistband and the pocket stay. We had to add a seam allowance to the pocket stay and had to create a left waistband pattern.

The following pattern parts are used for the slacks  
(See Appendix D, Exhibits B1 - B9):

1. Front left and right leg panel
2. Back left and right leg panel
3. Left and right side pocket front facing
4. Left and right side pocket back facing
5. In and out left fly
6. Right fly
7. Left waistband and waistband curtain
8. Right waistband and waistband curtain
9. Left and right pocket bearer or stay
10. Left and right side pocket bag
11. 5 belt loops

The requested pattern development work and the marker making took ten working days to complete. The work, however, was interrupted by a discrepancy that arose with the hip dimensions. After having completed the first group of slacks we found that we could not match the hip dimensions of our finished garments with the measurements shown on the dimensions chart provided by the Army NRD&EC. We immediately contacted them, explained the new problem, and then shipped five different size garments to them by overnight delivery. The next day we were told that the dimensions of the garments we sent were correct but the dimension chart we had been given was not. A new dimension chart was faxed to us which allowed us to meet the required dimensions without any further problems.

After the dimensions problem was cleared away the balance of the production of the short and regular length slacks proceeded smoothly. When the time came to produce the tall sizes we quickly realized that the grading of the front fly had been overlooked. The tall sizes have a 1-inch longer fly than the other lengths, therefore, they needed 8-inch zippers but none were specified. Again we contacted the Army team and made them aware of this new problem. Fortunately, we had 8-inch zippers in-house and the assembly of the tall sizes went smoothly after that. We shipped the last group of slacks on March 10th, in sufficient time to meet the March 12th deadline.

### MANUFACTURING ANALYSIS

The F.I.T./AAMTD project team feels that parts of the assembly process of the Army skirts and slacks should be examined for possible improvement.

1. Consideration should be given to changing the skirt zipper length to 7-1/2 inches. This would ease the zipper setting operation and decrease the bulk at the lower end of the zipper and pocket.
2. The Army skirt pockets are graded for three hip classifications with several size groups within each. This creates a massive logistical problem and a potential for mix-ups. Most garments made for civilian use use a single size pocket for all garment sizes. It is recommended that the Army adopt such a system for the skirt and thereby alleviate the problem. (It must be noted that the pocket of this skirt has only limited use, and, therefore, the size of the pocket bag is not critical.)
3. The waistband curtains for both the slacks and skirts are too wide on the sides that are joined to the base fabric. We had to cut away a strip 1/2 inch wide from the joining side to make it workable. The vendor of the curtains should be requested to make them available in the proper width.

A proper work aid should be used to set the waistband curtains to the waistbands. All potential manufacturing contractors should be made aware of such need so that a proper attachment may be obtained in time to meet production schedules.

4. The pattern for the back leg panel of the slacks has an offset on the inseam side (See Point 31 to Point 21 of Exhibit B2, Appendix D) to show the sewing machine operator the position of the inseam extension which runs from the crotch seam down the leg and ends where the normal seam allowance starts. It is recommended that the offset be removed and replaced with a notch so as to permit the use of an automatic serging machine. Besides, the offset will most likely be cut off during the manual serging operation, anyway.
5. The current grading of the slacks from regular to tall makes it necessary to use an 8-inch zipper for tall sizes. Either this fact should be clearly noted in the garment specification or the fly construction should be changed so as to permit the use of the present 7-inch zipper for all tall sizes.

FIT TEST RESULTS

The fit test of the prototype skirts took place between February 24th and March 4th, 1992. The fit test of the slacks was started on March 15th and was concluded on March 20th. The wear tests of both garments began on the 23rd of March and will run through May 29th, 1992.

Copies of pertinent parts of the fit test reports (Appendix C, Exhibits C1 and C2) which were prepared by the Army's project team were furnished to us. In them they note that the construction of the skirt's quarter top pockets is too bulky and does not lay flat. This tends to accentuate the wearers' hips, especially on the left side where the zipper closure is. The Army's project team recommends that the zipper closure be changed to a button closure and that the quarter top pockets be changed to on-seam pockets. Such changes will require extensive revision of the patterns since all the pattern parts related to the skirt front and pockets will have to be reworked and pocket bearer patterns will have to be added. Besides that, the button closure will also call for additional parts.

The slack fit test has led to recommendations by the Army's project team which only call for some pattern modifications: a one inch reduction in the upper thigh circumference; and, some narrowing of the legs to match the decrease in thigh dimension. They also suggest that the back crotch be made slightly fuller. These pattern changes can be done quickly since they are not very complicated.

CONCLUSION

The project concluded successfully which was very gratifying to the F.I.T./AAMTD project team. As the fit test reports show, even though there were pattern problems and other minor mix-ups, with proper communication and cooperation things can be accomplished quickly and correctly.

APPENDIX A  
GARMENT SPECIFICATIONS/CONTRACT REQUIREMENTS  
(Excerpted from contract DLA900-87-D-0016-0011)

C.3 APPLICABLE SPECIFICATIONS.

C.3.1 ENCL 1 SLACKS. Enclosed is an Army specification, Slacks, MIL-S-44092B(GL) dated 3 April 1987 and a drawing to be used as a guide for the experimental slacks with the following exceptions:

- (1) Straight waistband - the elastic has been eliminated in the back and there is now a center back (CB) outlet of 1-1/4 inch on each side of the waistband (2-1/2 inches total outlet in the back). There will also be a rubberized interlining similar to the men's waistband construction.
- (2) Outlet in waist, seat & crotch in back - the outlet in the back of the slacks starts at 1-1/4 inches on each side, to match the waistband, and tapers to 3/4" in the crotch area.
- (3) One dart - one dart on each side of the CB instead of two.
- (4) Wider front fly - the front fly topstitching has been widened to 1-1/8 inches.
- (5) Belt loops - 5 belt loops will be placed along the waistband.

C.3.2 ENCL 2 - SKIRT. Skirt specification MIL-S-44102B(GL) dated 13 June 1987 and a drawing (enclosed) are to be used as a guide for the experimental skirts with the following exceptions:

- (1) 3 gore skirt instead of a 4 gore skirt - the experimental skirt has two side seams and one CB seam.
- (2) 1/4 top side pockets.
- (3) CB outlet and rubberized waistband - the waistband and CB seam will have a 1-1/4 inch outlet on each side (2-1/2 inches total), and have a rubberized waistband interlining just like the slacks. The outlet on the skirt will be the same width (1-1/4 inches on each side) all the way down.
- (4) Belt loops - 5 belt loops will be placed along the waistband.

C.3.3 LABELING INSTRUCTIONS. The contractor shall include a size and contract number on the inside of each skirt and slack, located at the center back. The lettering shall be at least 1/4", -0, +1/8", high. The label shall show fastness to crocking and dry cleaning.



**C.4 GOVERNMENT FURNISHED MATERIAL.**

C.4.1 Patterns as follows for both the slacks and skirts: Natick will provide all pattern pieces. Patterns will be available by 30 October 1990, in the form of an AM-1 computer reel-to-reel magnetic tape or complete ozlid pattern.

C.4.2 Samples as follows for both the slacks and skirts: One skirt sample will be provided and one slacks sample will be provided which must be returned to Natick RD&E Center upon the completion of both contracts.

C.4.3 Fabric will be supplied as follows for both the slacks and skirt:

<u>Material</u>	<u>Type</u>	<u>Class</u>	<u>Specifications</u>	<u>Amount</u>
Poly/wool serge AG 344	III	3	MIL-C-823	aprox. 500 yds.
Rubberized waistband interlining	-	-	experimental	aprox. 500 yds.

The fabric will be supplied for the first phase of fall 1990. For the second phase in the summer of 1991, no fabric will be supplied as GFM. All other components for both phases must be supplied by the contractor, and are listed in MIL-S-44092B(GL) and MIL-S-44102B(GL).

**C.5 CONTRACTOR FURNISHED PROPERTY.**

The contractor shall furnish all necessary personnel, equipment, and findings (buttons, thread, zippers, etc.) necessary to complete the quantities for deliveries 1 & 2 listed in para. C.6. Findings shall be from approved suppliers if possible; if not, they shall esemble approved items to the extent practicable.

**C.6 SPECIFIED TASKS.**

C.6.1. It is very important that the contractor perform in a timely manner in the accomplishment of the following tasks. To assure that adequate progress is being made, the contractor shall call the Contracting Officer's Technical Representative (COTR) and provide a telephone briefing every Monday from the award of the contract to the end of delivery 1 and from the start through to the end date of delivery 2. The COTR is Ms. Martha McCagg, her telephone number is (508) 651-4602.

C.6.2\* Delivery 1 - below are the items needed and dates required:

<u>DELIVERY 1</u>	<u>TOTAL REQUIRED</u>	<u>CONTRACT START DATE</u>	<u>DATE ITEMS READY TO BE INSPECTED</u>
(1) Skirt	81	15 NOV 1990	Mid JAN 1991
(2) Slacks	81	15 NOV 1990	Mid JAN 1991

Skirt/Slacks TOTAL = 162

C.6.2.1. Tariff for Delivery 1 - For slacks and skirts see encl 1.

C.6.3\* Delivery 2 - items needed and dates required are as follows:

<u>DELIVERY 2</u>	<u>TOTAL REQUIRED</u>	<u>CONTRACT START DATE</u>	<u>DATE ITEMS READY TO BE INSPECTED</u>
(1) Skirt	220	Mid MAY 1991	1 JUL 1991
(2) Slacks	220	Mid MAY 1991	1 JUL 1991

Skirt/Slacks TOTAL = 440

\* Deliveries 1 and 2 were subsequently changed to the following:

<u>DELIVERY 1</u>	<u>TOTAL REQUIRED</u>	<u>CONTRACT START DATE</u>	<u>DATE ITEMS READY TO BE INSPECTED</u>
Skirt	55	March 11, 1991	May 17, 1991
Slacks	55	March 11, 1991	May 17, 1991

<u>DELIVERY 2</u>			
Skirt	220	Date of approval	8 weeks after approval
Slacks	220	Date of approval	8 weeks after approval

ENCLOSURE 1  
SIZE TARIFF FOR DELIVERY 1\*\*

SLACKS AND SKIRTS, WOMEN'S

<u>SIZE</u>	<u>SIZE</u>
3S	13S
3R	13SP
3RP	13R
3L	13RP
5S	13L
5R	13LP
5RP	14S
5L	14SP
6S	14R
6SP	14RP
6R	14R
6RP	14LP
6L	15S
7S	15SP
7R	15R
7RP	15RP
7L	15L
8S	15LP
8SP	16S
8R	16SP
8RP	16R
8L	16RP
9S	16L
9SP	16LP
9R	17S
9RP	17SP
9L	17R
9LP	17RP
10S	17L
10SP	18S
10R	18R
10RP	18L
10L	18LP
10LP	20S
11S	20R
11RP	20RP
11L	20L
11LP	
12S	
12SP	
12R	
12RP	
12L	
12LP	

\*\* The size tariff for Delivery 1 was subsequently changed, as Contract Modification 001102, to the following:

NEW SIZE TARIFF FOR DELIVERY 1  
PER CONTRACT MODIFICATION 001102

## SLACKS &amp; SKIRTS, WOMEN'S

7RP	13S	17S
7LP	13R	17R
8RP	13RP	17L
9R	13L	18S
9RP	13LP	18R
9LP	14S	18RP
10R	14SP	18L
10RP	14R	18LP
10L	14RP	20S
10LP	14L	20SP
11S	14LP	20R
11R	15S	20RP
11RP	15R	20L
11L	15RP	
11LP	15L	
12S	15LP	
12SP	16S	
12R	16R	
12RP	16RP	
12L	16L	
12LP	16LP	

SIZE TARIFF FOR DELIVERY 2  
SLACKS AND SKIRTS, WOMEN'S

SHORT

8M  
8W  
10J  
10M  
10W  
12J  
12M  
12W  
14J  
14M  
14W  
16J  
16M  
16W  
18M  
18W

REGULAR

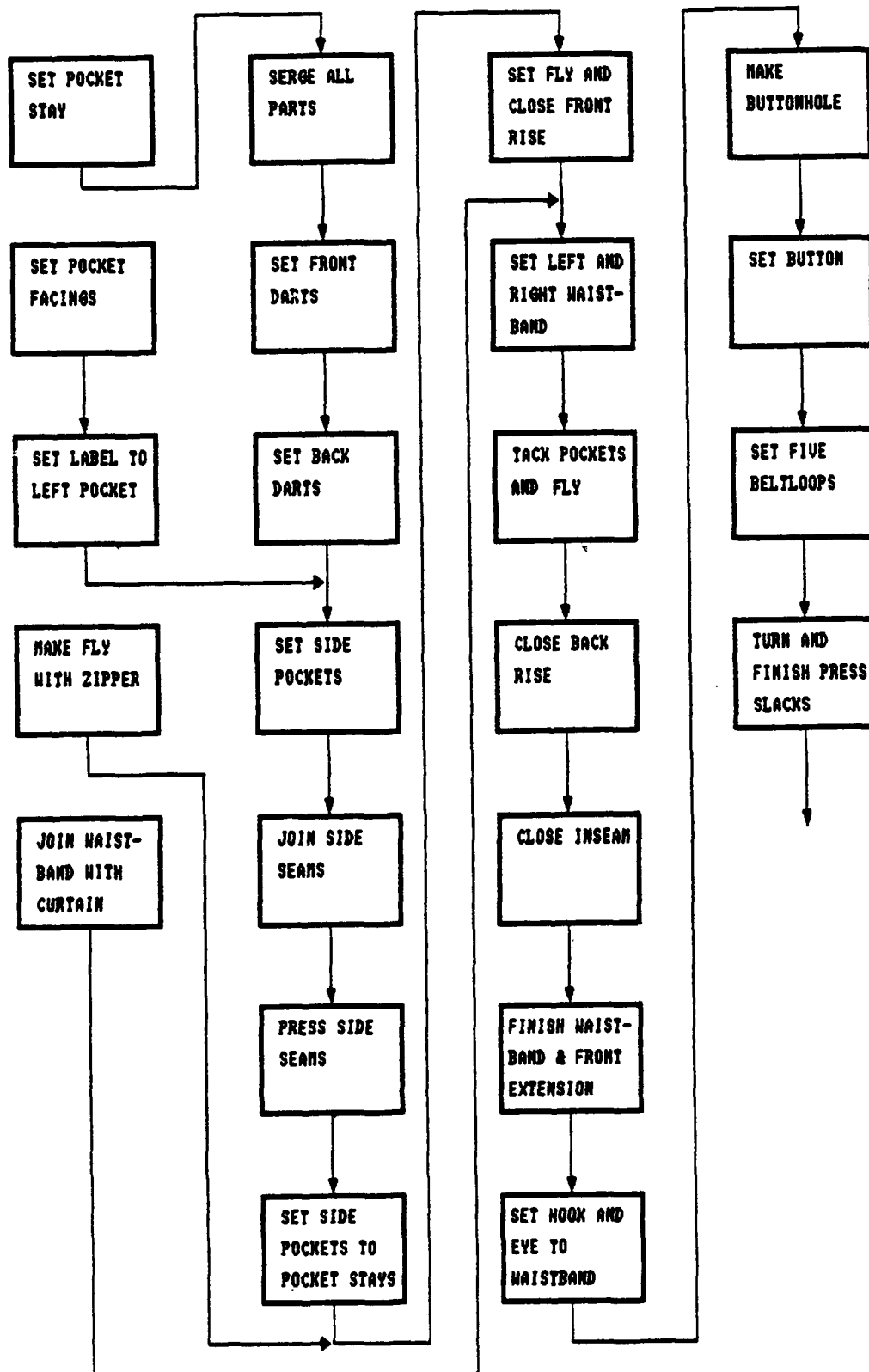
4M  
6M  
6W  
8M  
8W  
10J  
10M  
10W  
12J  
12M  
12W  
14J  
14M  
14W  
16J  
16M  
16W  
18M  
18W  
20M

LONG

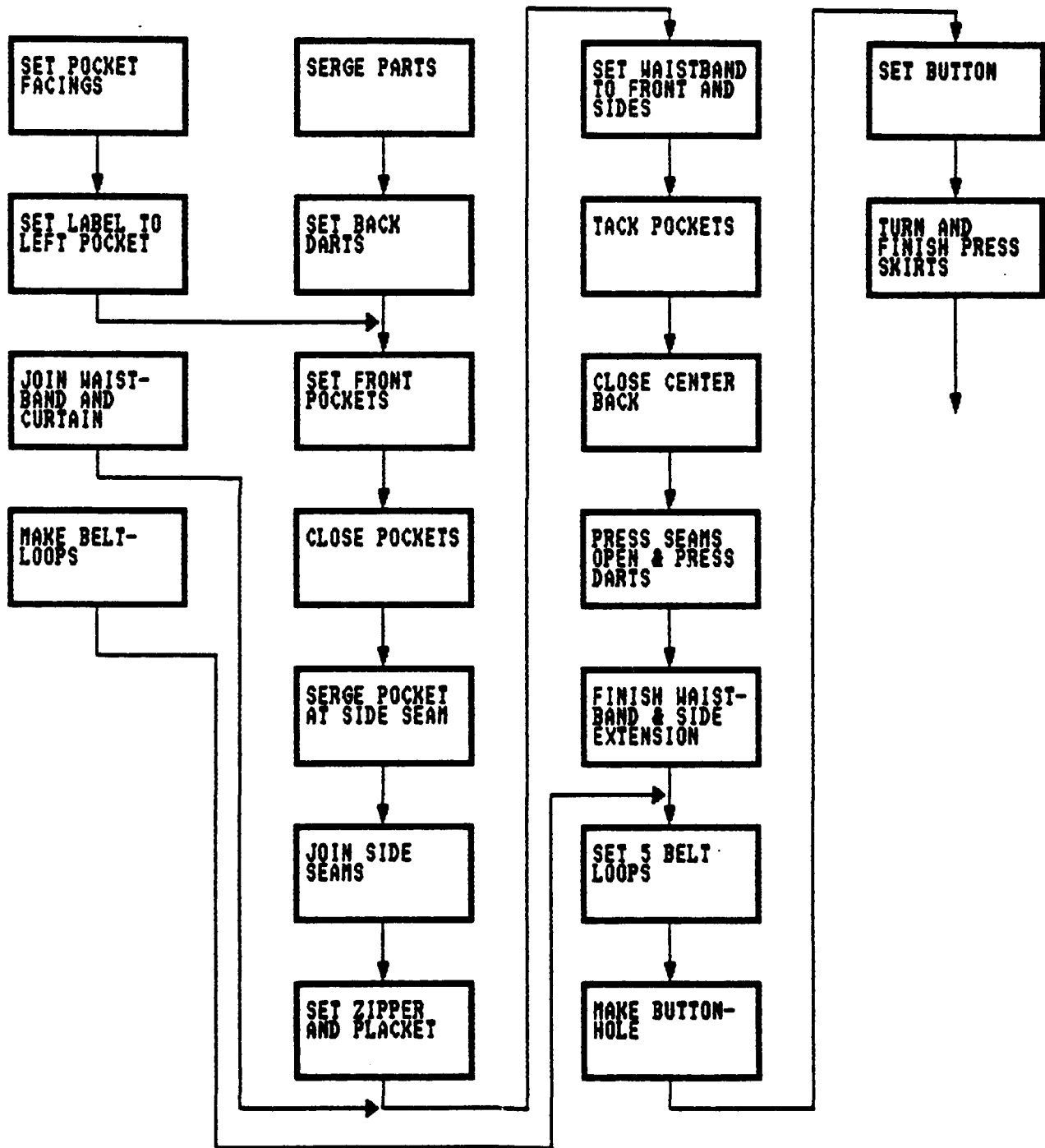
8M  
8W  
10J  
10M  
10W  
12J  
12M  
12W  
14J  
14M  
14W  
16J  
16M  
16W  
18M  
18W

J = Junior  
M = Miss  
W = Women

## U.S. ARMY SLACKS MANUFACTURING OPERATION SEQUENCE



U.S. ARMY SKIRTS  
MANUFACTURING OPERATION SEQUENCE



FIT TEST REPORT  
U.S. ARMY SKIRTS

STENC-IUU

SUBJECT: Report of Travel, CPT Kathleen Batton and Ms. Martha McCagg on 20 February to 4 March 1992 and for Ms. Diane St. Clair on 24 February to 4 March 1992 to the Military District of Washington (MDW).

## (2) Skirts

(a) Change the construction of the pockets. The current pocket construction is too bulky and does not lay flat. Even when the garment fits the subject, the pockets buldge slightly which tends to emphasize the hip area. This is especially true for the left side of the garment which also has the zipper in the side seam. The pockets also need to be slightly shorter in length.

(b) Recommend making a skirt sample with a button closure instead of the zipper closure and one with in-seam pockets as are in the current slacks. If the samples show some promise, they could be tried on some of the subjects and shown to others. A question could be included on the questionnaire to get the women's response to the proposed changes.

d. Conclusion: The first issue phase of the Wear Test was well organized and achieved its overall goals. The items were well received by a majority of the test subjects. The second issue phase is scheduled to begin the week of 16 March. The Wear Test is scheduled to begin on 23 March and finish on 29 May 1992. — The Soldiers' Command

Encl CPT KATHLEEN M. BATTON  
R&D Coordinator

MARTHA MCCAGG  
Textile Technologist

DIANE ST. CLAIR  
Fitting Evaluator

CF:  
C. RDESD  
PM-CIE  
CDR, USAIS  
TRADOC  
TECOM  
ASCID/MAJ Yancey  
SSD/BSO/HFB  
Clemson Univ.  
FIT/NTC



FIT TEST REPORT  
U.S. ARMY SLACKS

STRNC-IUU

SUBJECT: Report of Travel, Ms. Martha McCagg on 11-20 March 1992 and CPT Kathleen Batton and Ms. Holly Salcido on 15-20 March 1992 to the Military District of Washington (MDW).

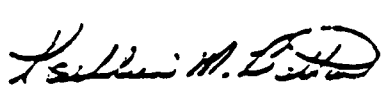
(4) cont'd. This fitting/evaluation phase utilized garments which had been measured to ensure they were within the allowed tolerances. Then the subject tried on items that would be issued to them. The issue garments were not measured, therefore, discrepancies in the fit sometimes occurred. Each garment that required alterations was properly marked by Ms. McCagg, or Ms. Roy and SGT Osborne (on the days they were assisting).

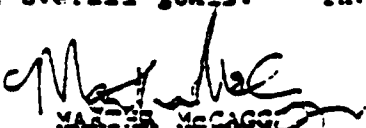
(5) Each test participant returned to CPT Batton's area where she wrote the alterations paperwork, marked the garments with the subject's number, and filled out their hand receipts. All questions were answered and participants kept any garments not requiring alterations. They were instructed on when and where to pick up their altered garments. The time required for each test subject averaged about 1 to 1-1/2 hours. Most of the subjects arrived on time and were well informed. A total of 181 test subjects were fitted into uniforms.


(6) The new sizing concept of fitting the slacks waist first and then the hips worked quite well. The newly modified slacks fit most people well, however, some minor but necessary modifications must be made to improve the fit.

c. Recommendations/Required Actions: Modify the slacks patterns as follows: Reduce the upper thigh circumference by 1 inch, narrow the bottom leg slightly to remain in balance with the upper leg, and lengthen the back crotch slightly.

d. Conclusion: The second issue phase of the Wear Test was well organized and achieved its overall goals. — The Soldiers' Command

  
CPT KATHLEEN M. BATTON  
R&D Coordinator

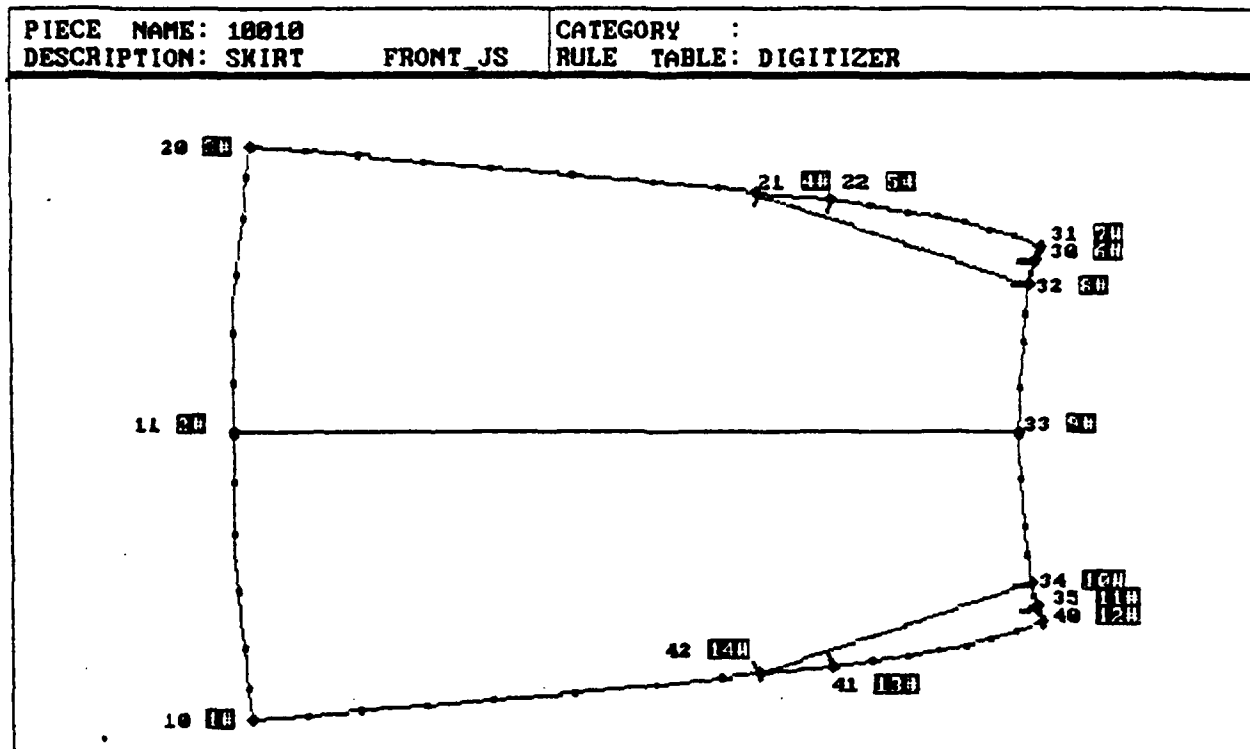
  
MARtha McCAGG  
Textile Technologist

  
HOLLY SALCIDO  
Textile Technologist

CF:  
C. RDESD  
PM-CIE  
CDR, USAIS  
TRADOC  
TECOM  
ASCID/MAJ Yancey  
SSD/BSO/HFB  
Clemson Univ.  
FIT/NYC

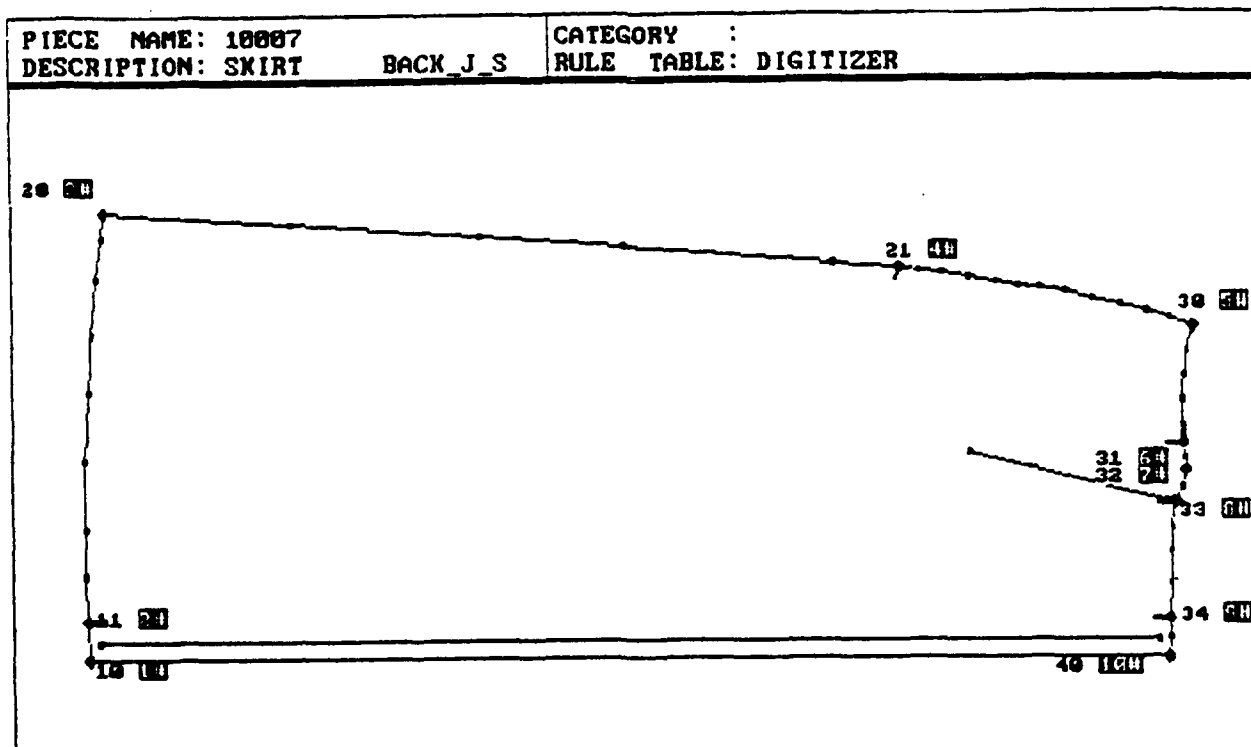
## PATTERN PARTS

## U.S. ARMY SKIRT

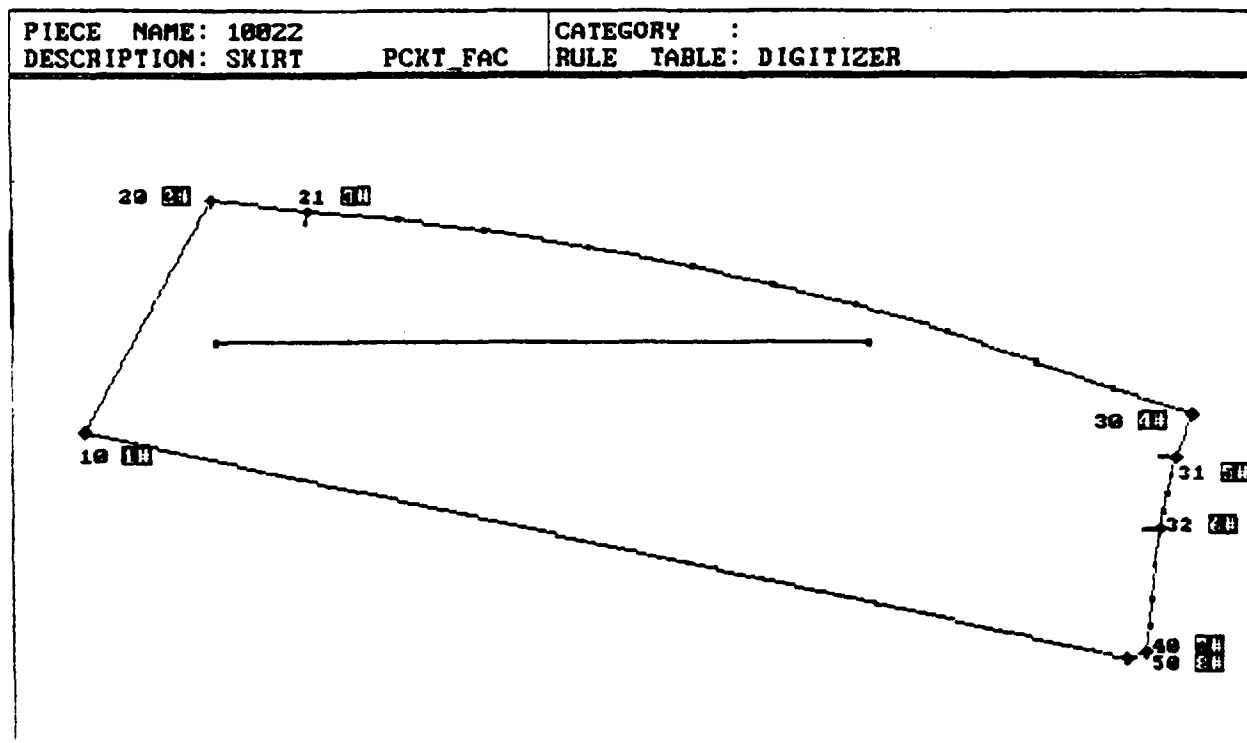


A1 - Front Panel

A2 - Left and Right Back Panel



PATTERN PARTS  
U.S. ARMY SKIRT



A3 - Left and Right Pocket Facing

## PATTERN PARTS

## U.S. ARMY SKIRT

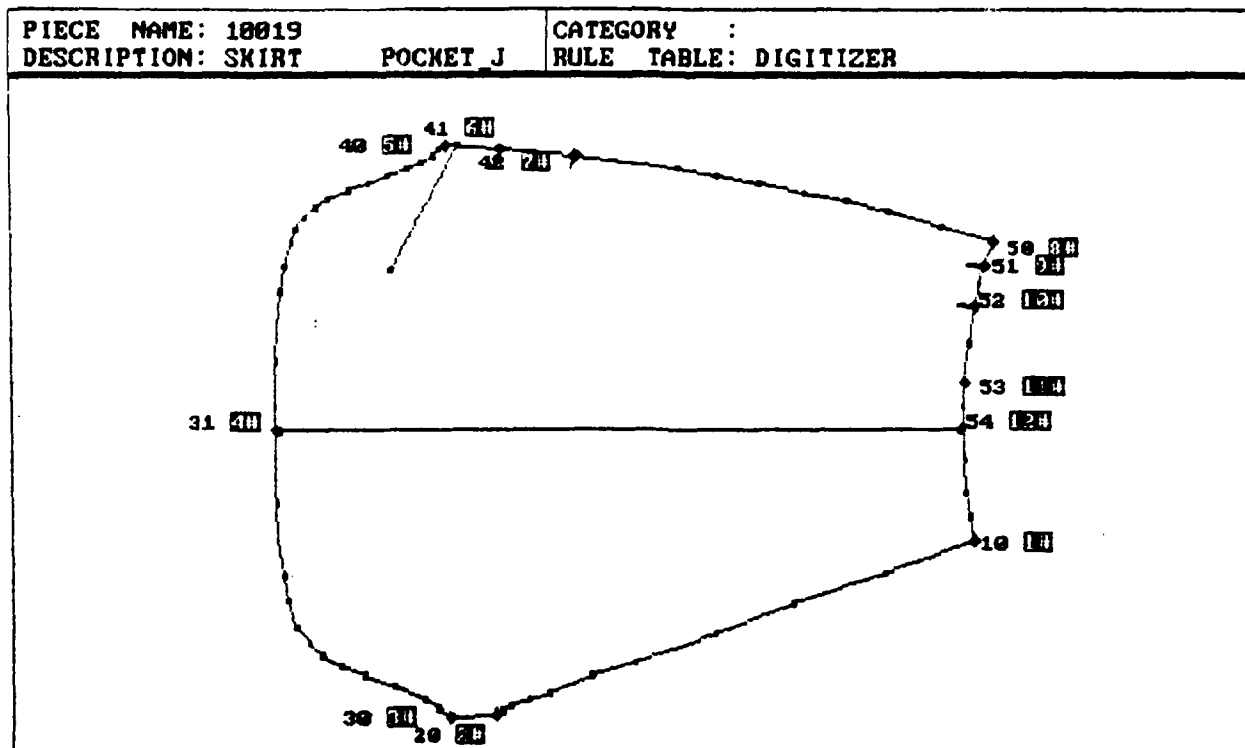
PIECE NAME: 10023	CATEGORY :
DESCRIPTION: SKIRT BCK_WBND	RULE TABLE: DIGITIZER

A4 - Front and Back Waistband

A5 - Front and Back Waistband Curtain

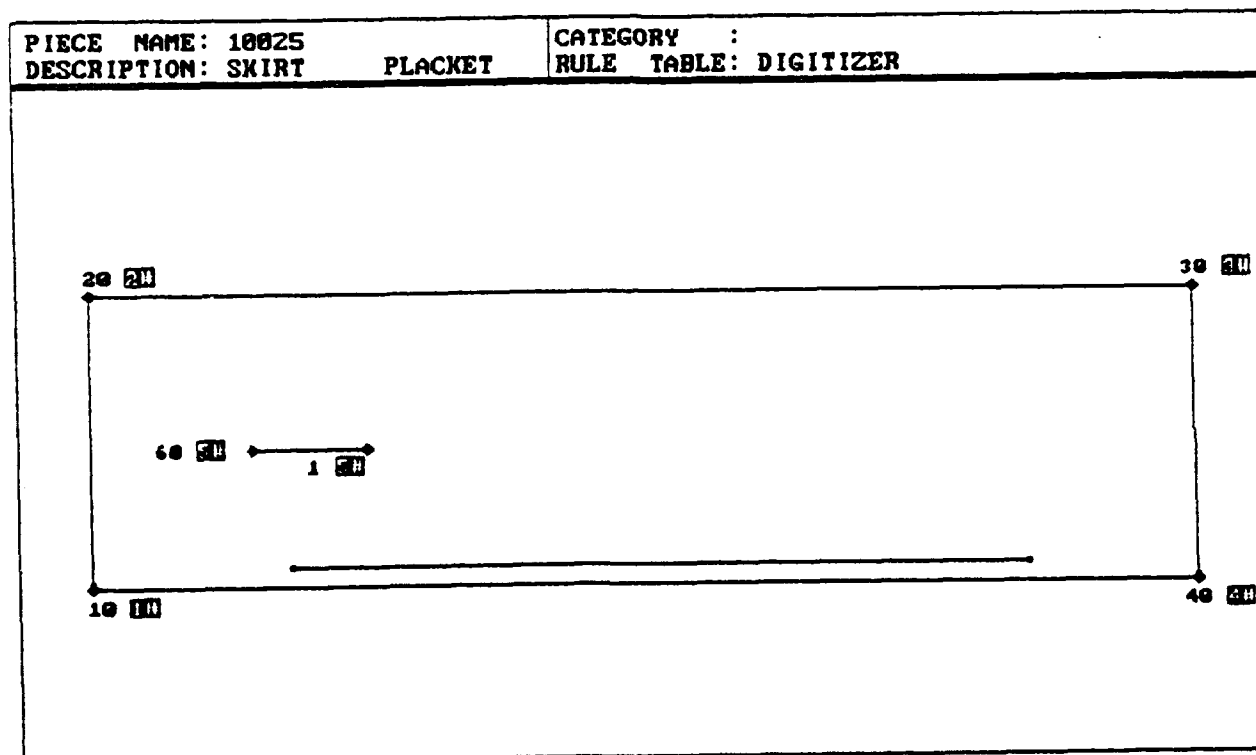
PIECE NAME: 10024	CATEGORY :
DESCRIPTION: SKIRT FRT_WBND	RULE TABLE: DIGITIZER

PATTERN PART  
U.S. ARMY SKIRT

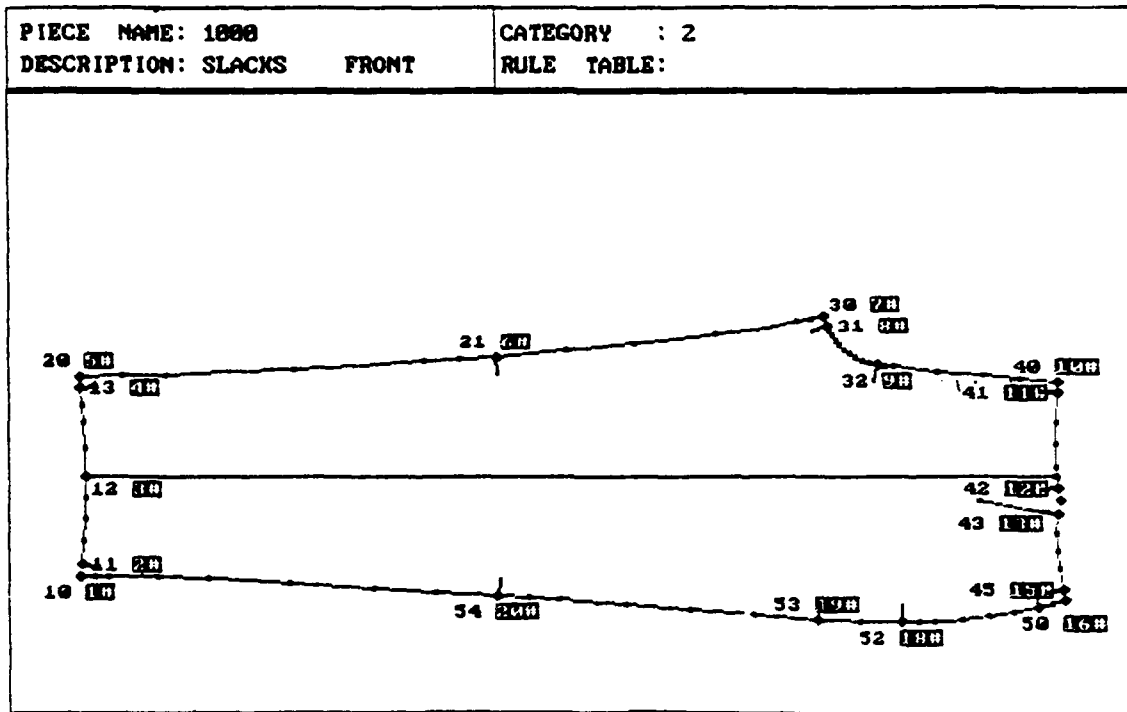


A6 - Left and Right Pocket Bag

A7 - Zipper Placket

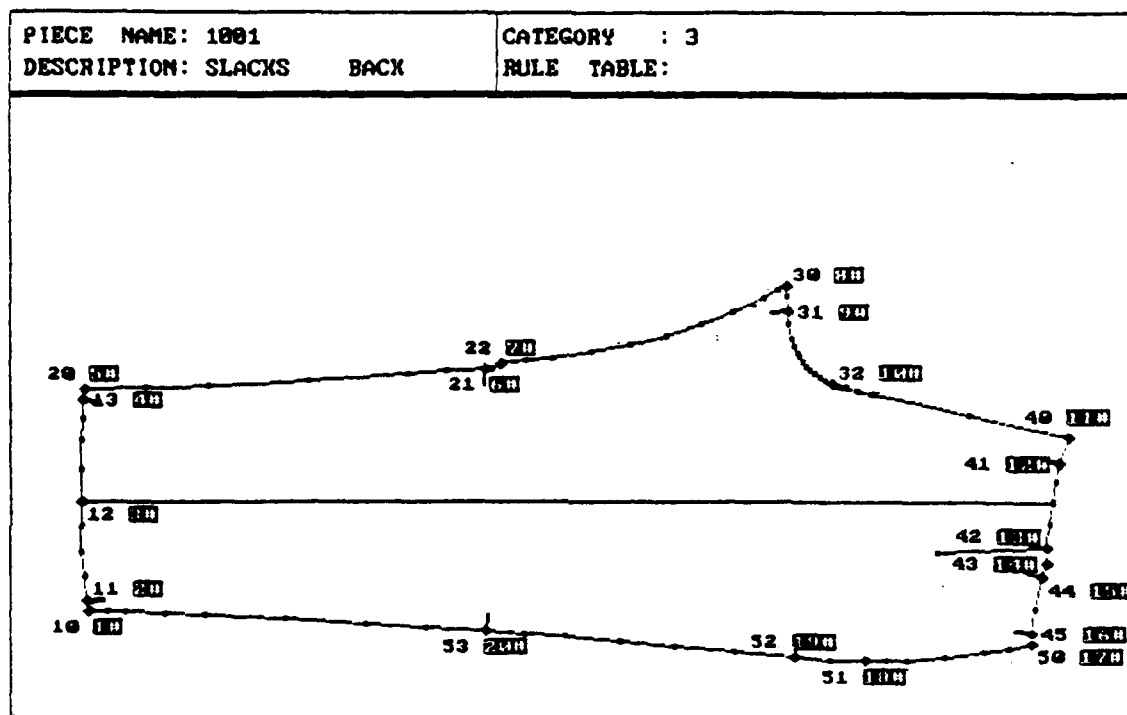


# PATTERN PARTS U.S. ARMY SLACKS

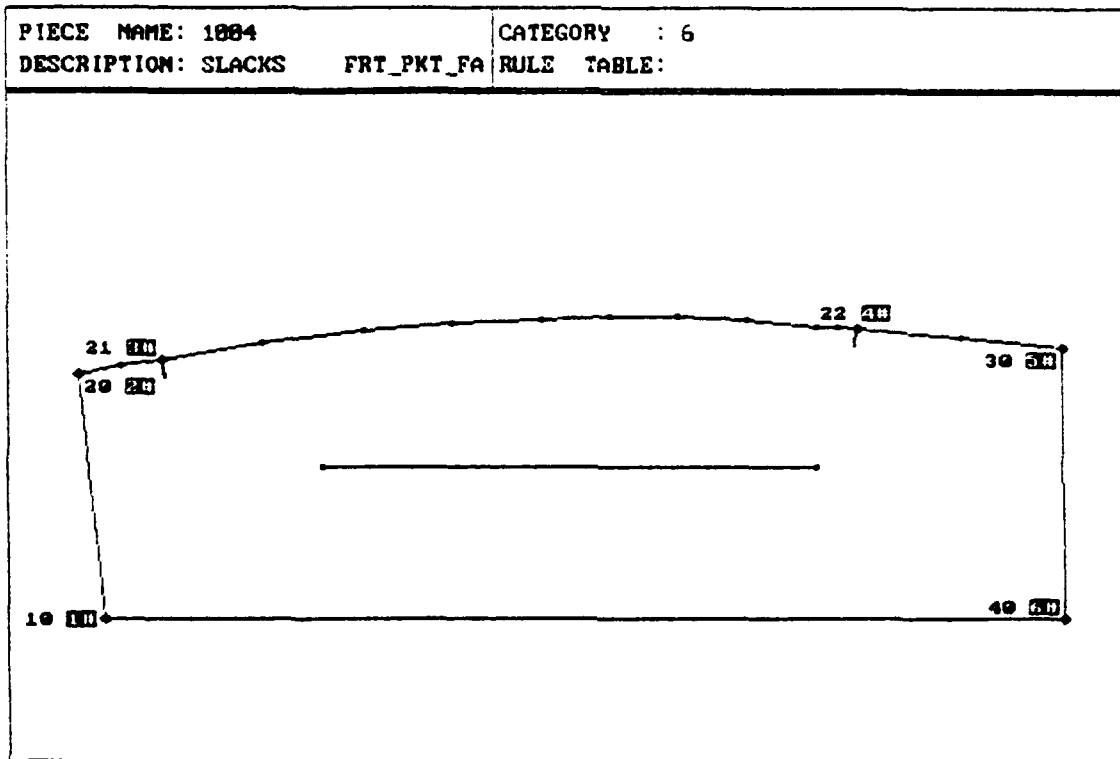


B1 - Front Left and Right Leg Panel

B2 - Back Left and Right Leg Panel

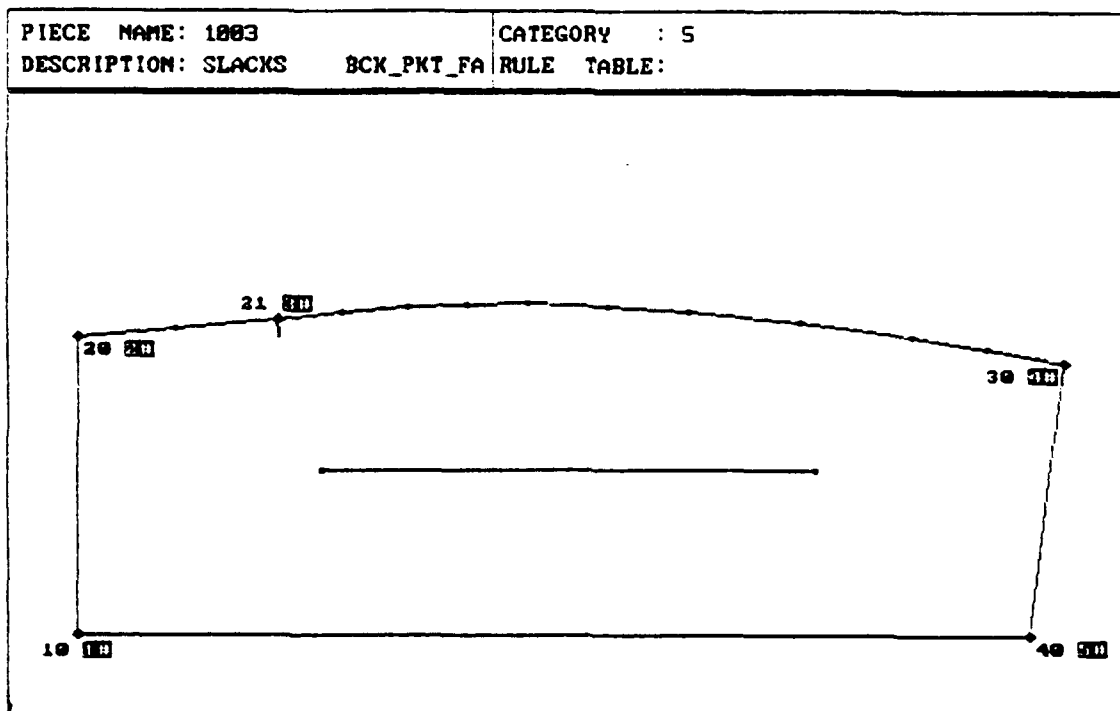


PATTERN PARTS  
U.S. ARMY SLACKS

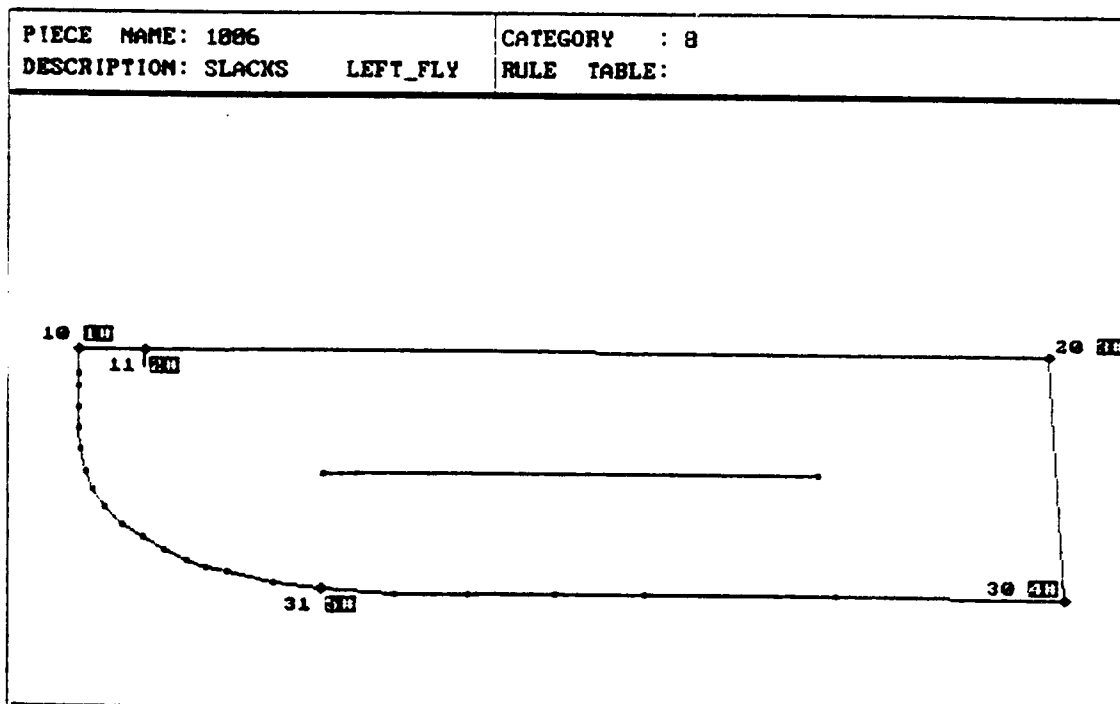


B3 - Left and Right Side Pocket Front Facing

B4 - Left and Right Side Pocket Facing

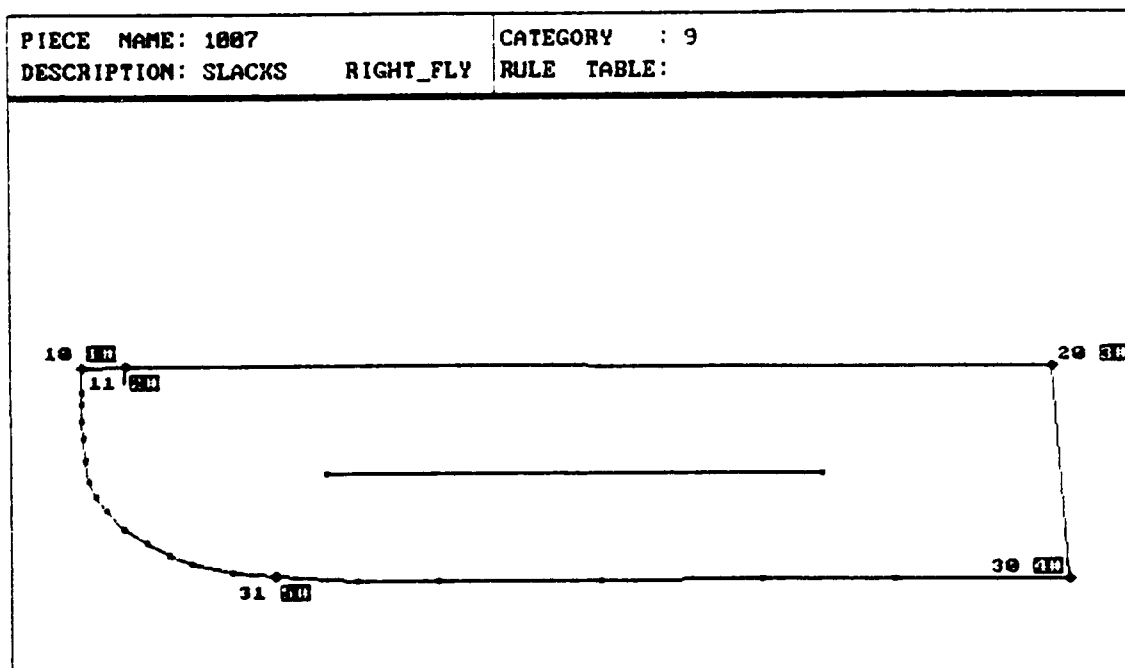


# PATTERN PARTS U.S. ARMY SLACKS



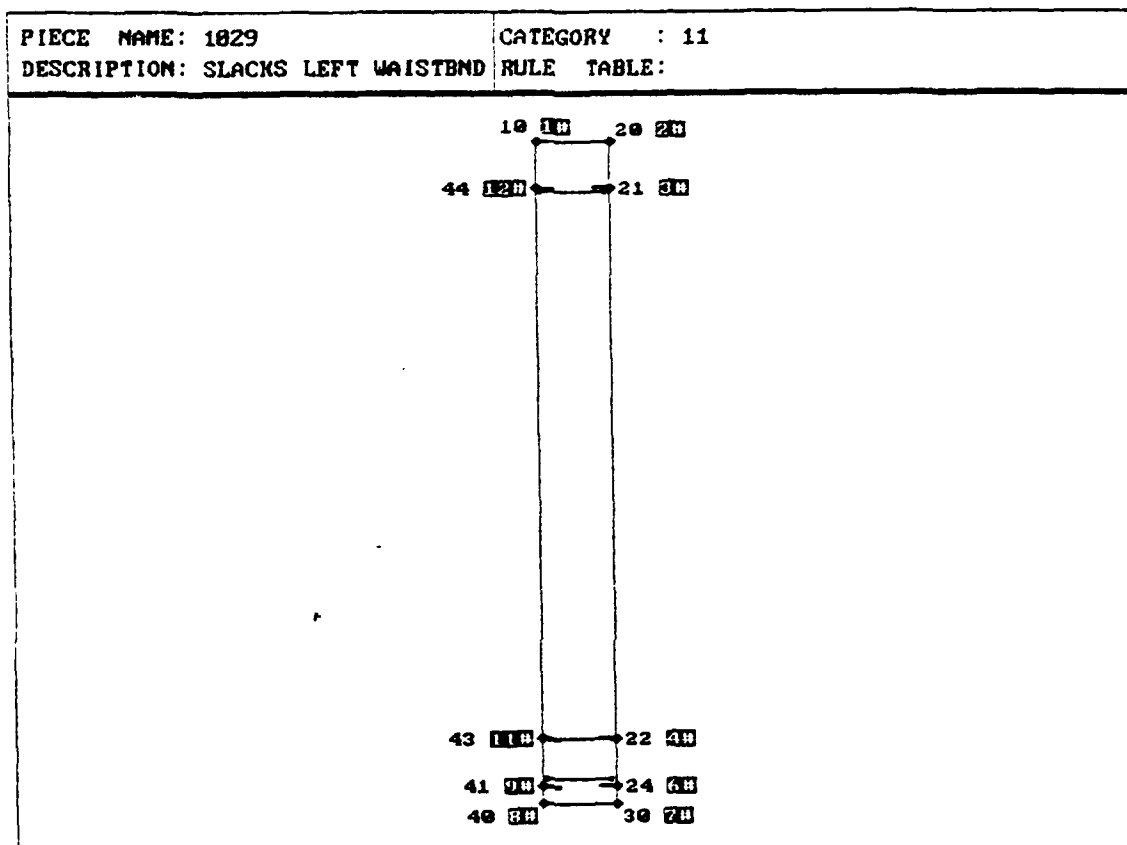
B5 - In and Out Left Fly

B6 - Right Fly



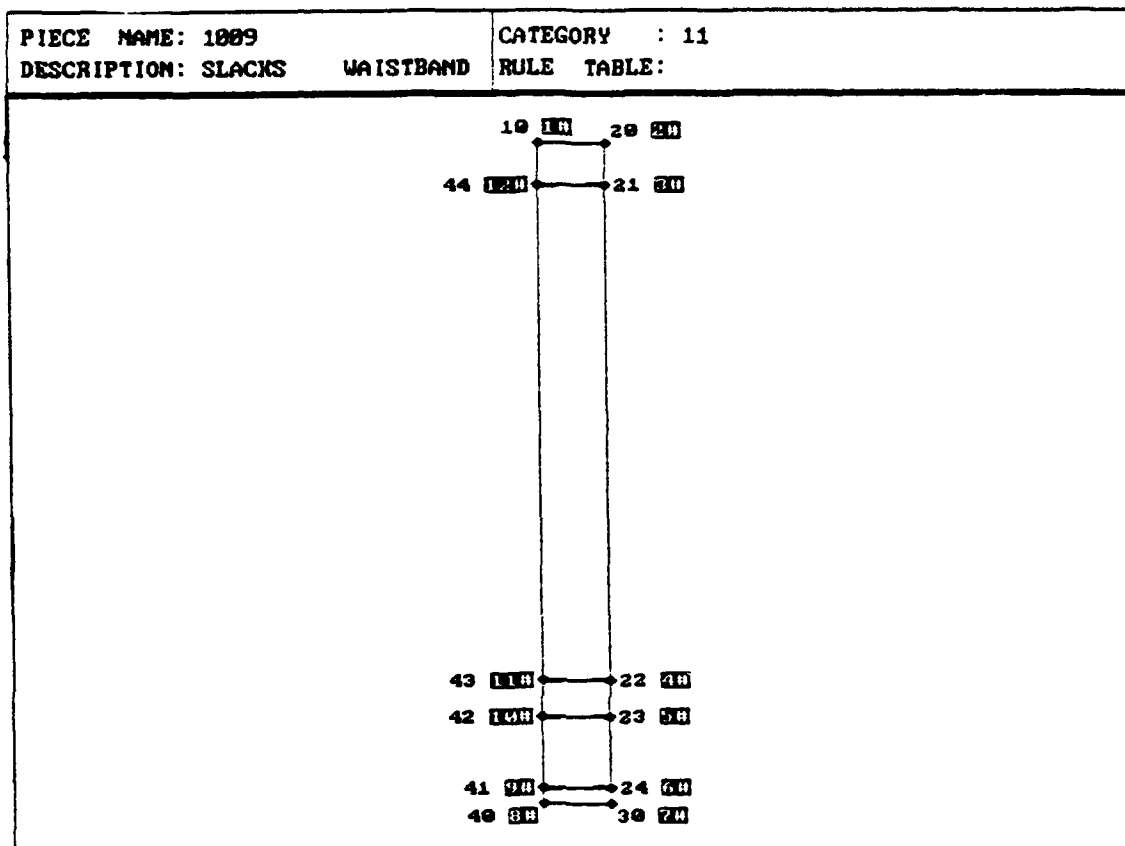


PATTERN PART  
U.S. ARMY SLACKS



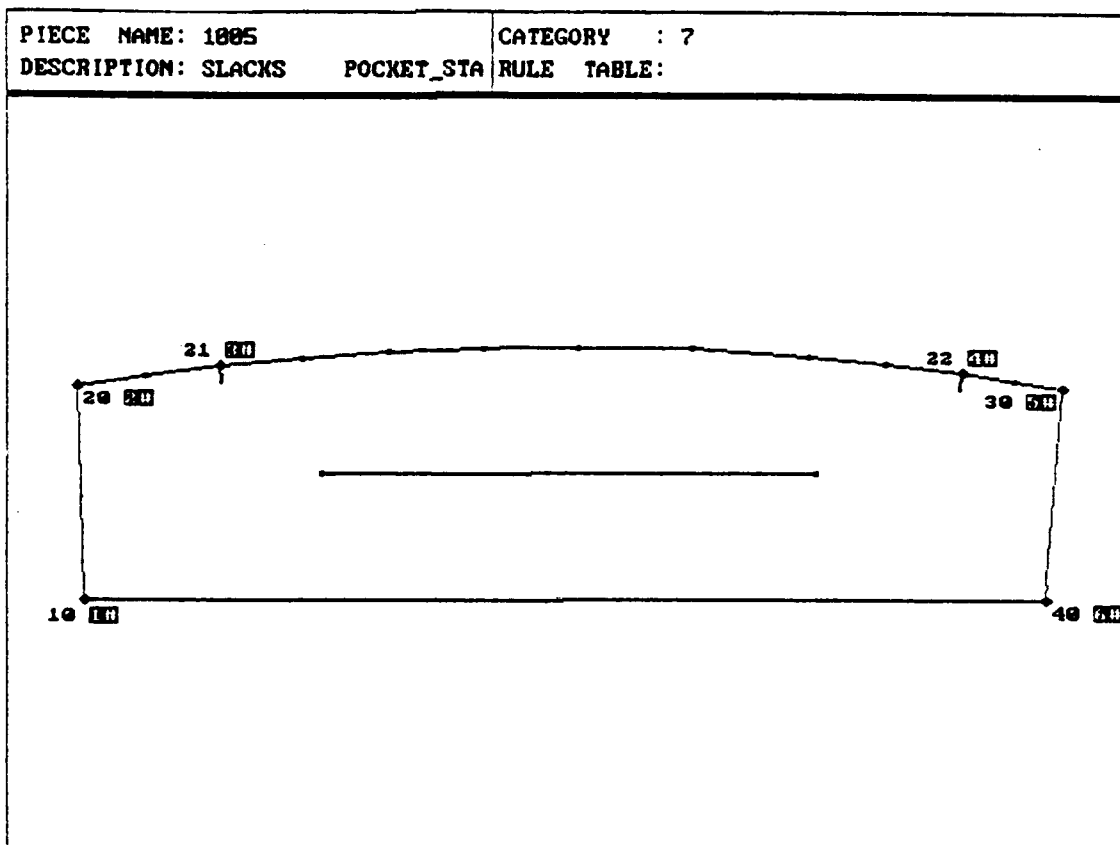
B7 - Left Waistband and Waistband Curtain

# PATTERN PARTS U.S. ARMY SLACKS



B8 - Right Waistband and Waistband Curtain

PATTERN PARTS  
U.S. ARMY SLACKS



B9 - Left and Right Pocket Bearer and Stay